



FPPC

Farm Pilot Project Coordination, Inc.
"Technologies for Nutrient Management"

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June 30, 2005

To: Mr. William Boyd - Leader, Animal Waste Utilization Team
East National Technical Support Center - NRCS

From: Bob Monley, General Manager, FPPC Inc.

Copy: Carolyn Adams, NRCS – Acting Director ENTSC
Bruce Newton, NRCS - Director WNTSC
Ron Williams, NRCS – Director CNTSC
Richard Salem, Board Chairman & Executive Director – FPPC Inc.
Robert Zaytoun, FPPC Board Director
Hilliard Eure, FPPC Board Director
Dr. Robert P. Carnahan, FPPC Board Director
Peter Hubbell, Principal - Water Resource Associates
Sara Royer, FPPC Treasurer
Barry Kintzer, NRCS - HDQ/DC
Frank Bordeaux, Executive Director – N.C. Agricultural Finance Authority
Frank Lancaster, N.C. Agricultural Finance Authority
Tim Robinson, FPPC Field Coordinator
Susan Mcloud, NRCS – AWUT, ENTSC

Re: FPPC Quarterly Update – April 1 thru June 30, 2005

Executive Summary

The quarterly report is intended to update the NRCS and the FPPC Inc. Board of Directors on the status of the innovative technology pilot projects. The first Technology Summit, conducted May 4th thru May 6th in St. Petersburg, was generally well received. Suggestions for improvement from participants, pictures and portions of the keynote address are available on the farm pilot website at www.fppcinc.org.

Five (5) pilot projects with final reports are now complete. In addition, two (2) technology providers have also completed their farm pilot demonstrations and are in the process of drafting their final reports. Negotiations and price agreement for the two (2) pending project proposals await a final Board funding decision but these revised proposals were reviewed in a special meeting held on June 16th. The Professional Review Panel (PRP) has completed its evaluation of new proposals received against the latest RFP and will make its funding recommendations to the Board in a meeting scheduled for July 19th.

OPERATIONS Report -----

1. In response to the latest RFP, twenty three (23) proposals have been received and graded by the professional review panel (PRP). This was greatest response to a FPPC Request for Proposal to date. Recommendations will be presented to the Board of Directors in a funding review scheduled for July 19th. The PRP has invested numerous hours in discussion and organizing data during the evaluation process. Feedback, to those who have submitted proposals, will follow the July 19th meeting.
2. In an attempt to better understand the water/nutrient challenges and funding needs of the Okeechobee region, an exploratory meeting has been arranged with South Florida Water Management District. The July 7th meeting in Tampa will host Ms. Benita Whalen, Service Center Director, Ms. Susan Gray, Division Director and Mr. Don Nuelle, Senior Supervising Engineer. The purpose of the meeting is to explore common ground and possible cost sharing opportunities.
3. The initial Technology Summit received good marks from those in attendance at the May symposium at the Vinoy Resort in St. Petersburg. The interaction of leaders from agri-business, government, the technology providers, industry producers and researchers made for a lively debate yet productive exchange. NRCS – Assistant Chief Central Region, Merlin Bartz, challenged the group and shared his insight during his key note address.
4. Following the symposium on May 6th, the FPPC Board met. D&O insurance, workmen's compensation and pollution coverage at the farm pilot site were insurance issues discussed. Coverage for pollution liability was tabled until the underwriter has an opportunity to make a formal presentation and explain their proposal. Additional questions were raised regarding the revised proposals submitted by GRRO and Utah State.
5. In a follow up teleconference on June 16th, the Board further reviewed the funding request of these outstanding proposals. In another motion, Dr. Robert Carnahan, Associate Dean of Research, College of Engineering at the University of South Florida was nominated and added to Board of Directors.
- 5-6. The annual A-133 audit for FY-2004 was initiated (as scheduled and on time) by Lewis, Birch & Ricardo, LLC during the second week of May. This year's onsite inspection included travel to a completed demonstration project site at the Posey Dairy near Lake Placid. At this point, the field inspection and data gathering for the audit has been completed and the results will be presented to the Board on July 19th.
7. The NRCS/FPPC cooperative agreement, for the grant monies, has been signed by both parties on 10 June 2005 obligating \$ 5,256,000.00 of additional funding.
8. In other matters, the State of Florida has sent notification that FPPC Inc. has been granted tax exempt status from Florida sales and use tax. Additionally, efforts were expended this month to verify that Farm Pilot Project Coordination, Inc. is registered as a Florida not-for-profit organization in those states where FPPC is transacting business.

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Progress at individual Pilot Demonstration sites is summarized below:

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RMG Strategies, Ltd and Microganics (2 sites) -----

Process:

- The use of “Bio-Regen Animal” product contains “Carboxx” and Bacillus microbes, a natural, supersaturated, highly soluble, high reactivity humic acid (HRHA)
- The ultra-pure formula provides an unprecedented capacity to capture and absorb a wide array of impurities found in soil or wastewater
- This process will provide a 75% nutrient reduction in the waste water column, concentrating nutrients in the sludge layer while decreasing odor
- Poultry and swine lagoon application

Jacobs Ranch site #1 -----
Layer hen facility in Carmine, Texas

Problems Encountered:

When low oxygen and temperature combined to retard the effect of microbes, two blue frog pumps were added to promote more complete mixing in the lagoon. Visual changes were apparent following improved mixing.

Preliminary testing and project status:

Floating solids on the treated primary lagoon (P1) have been reduced to feathers and egg shells. The untreated lagoon continues to exhibit increasing volumes of highly organic floating solids. Above normal rainfall rates caused the lagoons to fill above regulated levels and once the rains ended, state regulations required that both lagoons be reduced in volume, via land application, to allow for emergency storage. This operation exposed anaerobic solids at the edge of the primary lagoons releasing odorous gases.

Due to continued inconclusive laboratory results for nutrient reductions, micro-biological testing was conducted to evaluate alternative microbial packages for optimal activity in this waste stream. Results supported discontinuing the current microbial package and initiation of Bio-Regen Municipal, which contains a more comprehensive and aggressive formulation. Dosing of Bio-Regen Municipal began June 16 in conjunction with continuous Blue Frog aeration operation. Initial maintenance dosing rates are 15ppm continuously through one aeration unit and 5ppm into barn flush water.

**Heritage Swine farm site #2
Lamar, Colorado**

Problems Encountered Project Status:

After this site was selected, new state mandates were put in place to lower water levels within the lagoons at Heritage Farms and surrounding farm locations. Unfortunately, this mandate requires removal of as much as half the existing volume in some lagoons and redistribution of effluent between lagoons, which compromises the testing protocol at the Heritage Farm location.

In order to capitalize on the Microganics hog waste treatment process, the project had to be terminated and another hog facility site selected. In late June 2005, Microganics and Smithfield/Murphy Farms had identified a farm in Bladen County, NC, the Holmes Tract (approximately 25 miles east of Fayetteville). This location includes multiple wean to finish sites with lagoon systems servicing a total of 70,000 head. Each lagoon is 3+ acres receiving waste, via flush, from 3 barns, 1350 head each. Two of these sites will be selected for the study and it was agreed that the facility manager will be responsible for collecting samples for shipment to the lab for analysis. Lisa Dehaas is scheduled to visit the Holmes Tract facility on Thursday, July 7 and will be joined by Frank Bordeaux, who will represent FPPC for the site visit.

AJT/Agrimond -----

Watson Dairy in Trenton, FL

"Florida Dairy Nutrient Management Demonstration Pilot Project for Watson Dairy"

Process:

- Sand/grit removal.
- Solids separation.
- Primary anaerobic treatment and secondary aerobic treatment with enhanced aeration.
- Suspended solids precipitation using polymers.
- Anoxic treatment for denitrification prior to land application.

Project Status:

The new waste water tank has been now been erected and the failed secondary basin has been filled and capped. Damage to the access road, caused during heavy construction, has been repaired

Initial cleanout of the primary basin and systems check has been completed by AJT-Agrimond. Final cleanout and systems check will be completed after irrigation equipment is installed and the connecting piping is functional.

All irrigation equipment for the modification to the system has been placed on order through Tri-county irrigation and will be delivered by July 1st. Installation of the connecting pipes, pumps and equipment is scheduled to commence the week of July 11th. The connecting

flange was installed in the new above ground tank. FPPC expects the system to be operational in July.

**Applied Chemical Magnesias Corp. (ACM) -----
Bella Holstein Inc. - Dairy in Platteville, Colorado**

Process:

- Easily-assembled recovery system that utilizes the reaction capabilities of inexpensive, milled brucitic marble to extract between 75% - 90% of most nutrients
- Uses magnesium source to react with Nitrogen & Phosphorous to form a crystal precipitate.
- Uses mechanical cellulose separator, a series of reaction tanks (sized for the anticipated flow) with simple mechanical (paddle) agitation, and a hydro-cyclone separator and drying screen for the recovery of the precipitate.
- Precipitated crystals and liquid are sent to the drying screen; crystals are separated from the liquid then stored for various farmers to use as a slow release fertilizer. The remaining liquid flows to a lagoon for solids settling.

Problems Encountered:

A conference call was held with Tim Robinson, Pete Hubbell, Bob and Mac McCreless and Luke Rettele to assess current status on ACM's FPPC project at the Bella Holsteins site. Initially, mechanical failures developed at the site while attempting to bring the system online. Beyond the specific agitation problems within the reaction tanks, the latest findings has revealed unforeseen chemistry issues with the reaction process.

1) Mac McCreless explained that the pH levels are too high for the brucitic marble to efficiently accumulate phosphorous from the effluent within the reaction tanks. Coupled with the high flow rate of the effluent from the barn and milking parlor ACM is unable to achieve a 75% removal of phosphorous from the waste stream before it is emptied into the lagoon basin.

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2) Several possible suggestions were made for consideration: 1) to add on another cost effective technology in order to bring pH levels within acceptable parameters before treatment in reaction tanks or 2) halt project, salvage existing equipment and documents current findings in a final report 3) use existing lab for testing effluent from the lagoons or other locations in order to determine ideal pH levels for processing effluent.

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3) During the discussion ACM explained that one way of lowering the pH prior to treatment within the reaction tanks would be to inject sulfuric acid, the addition of acids on the farm would probably not be welcomed by the farmer and local regulation authorities. Another suggestion would be to draw effluent from the lagoons then into the reaction tanks, but the pH levels tested within the lagoons at several different locations appear too high for the brucitic marble to efficiently accumulate phosphorous

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At this time further investigation and a plan forward is needed to determine why the pH levels are so high within the waste stream.

Chemical Lime ----- **Aprile Dairy in Riverview, FL**

"Nutrient Removal from Dairy Farm Wastewater Using Lime"

Process:

- Use of chemical lime to reduce nitrogen and phosphorous loading in dairy wastewater.
- Screening and sand removal.
- Dewatered effluent treated with lime to precipitate P and N.
- Ammonia captured as ammonium nitrate.
- PH reduced by utilization of CO₂ gasses vented from flash composter.
- Treated water recycled as flush water.

Problems Encountered and Project Status:

Leasing a portable screen from Vincent Inc. in Tampa has been investigated and found to be a cost efficient alternative for the T-Rex solids separator, which has been problematic throughout the project. An offer has been made for purchasing the T-rex at salvage value. Piping modifications will be required to accommodate the new configuration.

Another development which could significantly threaten project completion at Aprile Dairy is an active rezoning initiative in the area. Posted signs indicate public hearings will begin on August 15th. Large tracts of residential development have sprung up and rapidly completely surrounded the Aprile Dairy site since the project was undertaken.

Meanwhile conditions on site have continued to deteriorate. The lagoon appears to be overflowing with solids and the chopper pump will not power on. Housekeeping in general is making the project more difficult. FPPC is evaluating how to best to expedite project demonstration results in light of the recent developments and remaining project work effort.

Required action items are summarized below:

- Chopper pump needs to have power restored and freed of debris that has jammed the blades. A rental sump pump needs to be brought onsite in order to remove the majority of solids in the lagoon for chopper pump inspection and repair if needed. Sunbelt rentals have been contacted and are on standby once power is restored to the chopper pump.
- Peter Allen, local electrician, was contacted concerning the power problem with the chopper pump and will be making a site visit.
- Vincent Inc. has been lined up to rent a side-hill screen for solids separation due to the inability of the T-Rex separator to perform.
- Other outstanding tasks include replacing inoperable probes/flow meter and restoring water at the portable unit.

**Renewable Oil Inc., Alabama Operations -----
Mills Poultry Farm in Russellville, AL**

"Demonstrating Bio-oil Technology for Poultry Litter Nutrient Management"

Process:

- Mobile processing plant to burn poultry litter.
- Poultry litter would be removed from houses and burned.
- "Pyrolysis" process produces nutrient rich ash and vapors that are converted to bio-oil.
- Bio-oil and ash would both be available as marketable products.
- Bio-oil is a low-grade fuel for furnaces or heaters to warm poultry houses.

Problems encountered and project status:

Notification from ROI concerning the possible sale of the Mills farm has been received by FPPC. The project however is still fully supported by the farm owner who will facilitate the transfer of the pilot demonstration obligation to a new owner if the farm is sold.

Previously authorized system modifications have been installed and completed with the exception of the condenser system. Char burner modifications were completed and tested as a unit, but have not been integrated into the system.

The new condenser system, installed in April did not meet functional expectations. Accordingly, ROI contacted FPPC and requested Mississippi State University conduct an independent review of the entire system. MSU has a local presence and practical experience with bio-energy systems. The results indicate that only minor changes to the condenser system and the controls are needed. A small amount of funding would be required and a modified work-scope has been submitted to FPPC for approval. Project completion and testing for the new scope would be expected within 6 months.

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Revised proposals awaiting Board funding action tabulated below:

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GRRO – proposed project # 2-----
Dave Minter Farm, Hardin County, Iowa

Process:

- System will use a highly efficient scraper system, efficient manure transfer and capitalizes on new construction techniques, low water consumption, minimum odor
- Pre-Separation Cyclone (liquid removal)
- Modular designed cyclonic drying system (Tempest dryer).
- Development of value added/commercial grade product - slow release fertilizer and/or gasification for the production of energy.

Project Status:

Funding request for \$ 784,000 pending FPPC Board action

Utah State University -----
Center for Profitable Uses of Agricultural Byproducts
Wade Dairy, Utah

Process:

- This system consists of an induced blanket reactor (IBR), a type of anaerobic digester converting organic carbon in the manure to methane and carbon dioxide.
- The (IBR) is followed by an electro-coagulation unit to concentrate nutrients from the effluent of the IBR. The anaerobic digestion system allows the electro-coagulation process to perform more efficiently.
- Effluent from the electro-coagulation unit will be combined with sludge from the IBR producing a valuable liquid fertilizer and soil conditioner.
- Treated water from the system is nearly odorless and contains less than 25% of the nutrients in the original waste stream.
- Biogas will be produced from this system and utilized to offset the electrical usage.

Project Status:

Funding request for \$ 254,000 pending FPPC Board approval

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Completed demonstration projects are listed below:
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Super Soils Systems, USA -----

Goshen Ridge Farms, LLC

Swine farm in Clinton, NC

“Solids Removal System to Reduce Environmental Impact of Swine Production”

Process:

- Solids separation system and the use of polymers to enhance dewatering.
- Anaerobic and aerobic activity to clean water
- Solids removed offsite for composting and marketing as value added product.
- Process is modular design and can be farm fixed or mounted as a mobile unit.
- Applicability for the cleanup of abandoned lagoons.

Project Status:

Demonstration project completed - final report being drafted.

Air Diffusion Systems -----

Cavanaugh Farm No. 1

Swine farm in Wallace, NC

“Advanced Microbial Treatment System (AMTS) at Cavanaugh Farm No. 1”

Process:

- Retrofits existing effluent treatment systems with suspended curtains to subdivide lagoon into discrete cells.
- Uses both aerobic and anaerobic processes.
- Forced air system and enhanced microbial activity utilizing aqua mats.
- A portion of the lagoon is covered to increase temperature, enhance biological activity and odor control.
- Treated water is reused for flush and spraying irrigated for crop production.
- Applicability for cleanup of abandoned lagoons.

Project Status:

Demonstration project completed – final report being drafted.

Global Resource Recovery Organization -----

GRRO – site # 1

Burt Farm & Livestock Co.

Swine farm in Marshalltown, IA

“Pork Nutrient Management Demonstration”

Process:

- System uses a coarse static screen with manure pumped from existing houses
- Followed by an advanced induced cyclonic dissolved air flotation (IC-SEP).
- Cyclonic drying system (GRRO’s Tempest).
- Value added products can be developed to include slow release fertilizer and/or gasification for energy use

Project Status:

Demonstration project completed and final report has been received. Unused equipment is being dispositioned for salvage value.

Royal Consulting Services, Inc. -----

Posey Dairy in Lake Placid, FL

“Florida Dairy Nutrient Management Demonstration”

Process:

- A Pond Enhanced Treatment & Recycle Operation (PETRO) process utilizing a series of lagoons, both aerobic and anaerobic, with a final polishing sand bed filter
- Includes enhanced aeration and fermentation processes.
- Polymeric ion exchange system provides for complete phosphorous removal.

Project Status:

The final report has been reviewed, issued and is posted on the FPPC website.

McGill Environmental Systems -----

Delway, NC (Central Processing Facility) With

Poultry Litter Collected from Farms in Sampson County, NC

“Nutrient Management Technology for Animal Feeding Operations”

Process:

- Centralized static pile (a forced aeration composting facility for the handling of poultry litter from area farms)

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- Test different formulas utilizing carbon sources such as cotton waste, hog waste
- Compost will be developed as a marketable compost/mulch product.
- The potential for utilization of compost as a substitute for methyl bromide will be analyzed.

Project Status:

The final report has been reviewed, issued and is posted on the FPPC website.

Cape Fear Resource Conservation -----

Rose Hill, NC - Central Processing Facility

Poultry Litter Collected from Duplin County, NC

“Demonstration Optimum Fertilizer of Ash from the BEST Solution for Swine and Poultry Manure Management”

Process:

- BEST technology provides for gasification of poultry and swine litter.
- Gasification process byproduct is nutrient rich ash.
- ACT process will turn ash into portable, usable fertilizer.
- Test marketing product with multiple users.

Major Problem Encountered:

Elevated and variable silica levels collected in the turkey litter samples prevented consistent nutrient capture and commercial practice needed for fertilizer labeling.

Project Status:

The final report has been reviewed, issued and posted on the FPPC website.

Mountain Organic Materials (MOM) -----

Randy Johnson and David Parsons Farms

Wilkesboro, NC

“Demonstration of Poultry Manure and Mortality Forced Aeration Composting Bin Systems”

Process:

- Portable on-farm forced aeration composting system.
- Handles both poultry litter and mortalities.
- Developed marketable compost products.

Project Status:

The final report has been reviewed, issued and posted on the FPPC website.

MACRO BUDGET-FPPC Inc.
APPROPRIATIONS FOR 2002, 2003, 2004 & 2005
EXPENDITURES FOR THE PERIOD JANUARY 1, 2002 - JUNE 30, 2005

Congressional Appropriation- 2002	\$4,500,000.00
Congressional Appropriation- 2003	2,700,000.00
Congressional Appropriation- 2004	4,700,000.00
Congressional Appropriation- 2005	5,225,000.00
Total Appropriations	<u>\$17,125,000.00</u>

EXPENDITURES

	Budget	Actual Outlays	Remaining Budget
2002/2003 Cooperative Agreement			
Project Related Costs	1,575,000.00	1,423,226.63	151,773.37
General and Administrative Costs-	459,000.00	423,272.19	35,727.81
Project Contingency	22,957.00	22,957.00	0.00
Agrimond	737,964.00	644,557.81	93,406.19
Air Diffusion System	298,510.00	291,084.94	7,425.06
Cape Fear RC & D	250,400.00	250,400.00	0.00
Chemical Lime	432,300.00	413,621.58	18,678.42
Global Resource Recovery I	485,765.00	446,786.51	38,978.49
McGill Environmental	342,000.00	342,000.00	0.00
Renewable Oil	447,114.00	411,430.08	35,683.92
Royal Consulting	493,832.00	493,832.00	0.00
Super Soil Systems	370,115.00	365,275.06	4,839.94
Mountain Organic Materials	60,000.00	60,000.00	0.00
Microorganics site 1	231,792.00	180,438.75	51,353.25
Microorganics site 2	39,991.00	0	39,991.00
ACM, LLC.	264,260.00	173,812.00	90,448.00
Utah State University – Wade Dairy	254,000.00	0.00	254,000.00
Global Resource Recovery II	400,000.00	0.00	400,000.00
Compendium/Symposium	35,000.00	33,199.15	1,800.85
Total Expenditures-2002/2003	<u>7,200,000.00</u>	<u>5,975,893.70</u>	<u>1,224,106.30</u>
2004 Cooperative Agreement			
Project Related Costs-	940,000.00	73,306.80	866,693.20
General and Administrative Costs	470,000.00	26,373.47	443,626.53
RFP 05 01- project commitments	1,040,000.00	0.00	1,040,000.00
RFP 05 02- project commitments	1,040,000.00	0.00	1,040,000.00
RFP 05 03- project commitments	1,040,000.00	0.00	1,040,000.00
Project Contingency-2004	120,000.00	0.00	120,000.00
Symposium	<u>50,000.00</u>		<u>50,000.00</u>
Total Expenditures	<u>4,700,000.00</u>	<u>99,680.27</u>	<u>4,600,319.73</u>
2005 Cooperative Agreement			
Total Expenditures-2005	<u>5,225,000.00</u>	<u>0.00</u>	<u>5,225,000.00</u>

TOTAL EXPENDITURES

17,125,000.00 6,052,616.97 11,072,383.03